A Comparison of Retention Between Acetal Resin and Stainless Steel Wrought Wire Retentive Clasp Arms

Abstract

The objective of this study was to compare the retention of three different groups of acetal resin retentive clasp arm and a group of stainless steel wrought wire retentive clasp arm. The differences in design of acetal resin retentive clasp arms were as follow: group A, 1/3 terminal clasp arm was below a survey line and engaged retentive undercut 0.02"; group B, 1/3 terminal clasp arm was below a survey line and engaged retentive undercut 0.03"; group C, 2/3 terminal clasp arm was below a survey line and engaged retentive undercut 0.03" where as group D, stainless steel wrought wire clasp arm engaged retentive undercut 0.02". Tensile load of each clasp arm was performed by a Universal testing machine and the retentive force for group A, B, C, and D were 1.21, 1.67, 1.51, and 6.32 N respectively. One way ANOVA and Dunnett T3
null
Cemento-enamel junction: CEJ

sand blasting

37% phosphoric acid, 3M ESPE Scotchbond™

Prime & Bond NT nanotechnology

flowable composite resin, Tetric flow, Ivoclar vivadent

analyzing rod

surveying arm sticky wax

long axis

self cure acrylic

Figure 1 Tooth in metal block

Figure 2.1

Figure 2.2

Figure 2.3

Figure 2.4

Cemento-enamel junction: CEJ
Figure 2.1 1/3 terminal retentive clasp arm below a survey line and engaged retentive undercut 0.02"

Figure 2.2 1/3 terminal stainless steel wrought wire retentive clasp arm below a survey line and engaged retentive undercut 0.03"

Figure 2.3 2/3 terminal stainless steel wrought wire retentive clasp arm below a survey line and engaged retentive undercut 0.03"

Figure 2.4 1/3 terminal stainless steel wrought wire retentive clasp arm below a survey line and engaged retentive undercut 0.02"

Figure 3 retentive clasp arms fixed to chromium-cobalt alloy frameworks in group A, B, C and D respectively
Universal testing machine, Instron, Instron Corp., Canton, Mass. (cross-head speed) 10 mm/min and used for universal loading (load cell) 100 N. All samples were secured to the universal testing machine using a metal hook pull the metal loop in chromium-cobalt alloy framework.

![Image](https://example.com/image.png)

**Figure 4** metal hook pull the metal loop in chromium-cobalt alloy framework

**Table 1** means of maximum tensile force in removing retentive clasp arms in group A, B, C and C and standard deviations in parenthesis

<table>
<thead>
<tr>
<th>Group</th>
<th>Force (N)</th>
<th>SD (N)</th>
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<tbody>
<tr>
<td>A</td>
<td>1.21</td>
<td>0.49</td>
</tr>
<tr>
<td>B</td>
<td>1.67</td>
<td>0.54</td>
</tr>
<tr>
<td>C</td>
<td>1.51</td>
<td>0.40</td>
</tr>
<tr>
<td>D</td>
<td>6.32</td>
<td>3.46</td>
</tr>
</tbody>
</table>

**Note:** Dunnett's multiple comparison test was used to compare the means of the groups with the control group. The significance level was set at 0.05.

**Discussion**

From the results, there was no significant difference in the tensile force required to remove the retentive clasp arms among groups A, B, and C. However, group D showed significantly higher tensile force compared to the other groups. This indicates that the chromium-cobalt alloy framework is more resistant to tensile forces compared to the other groups.

**Conclusion**

The results of this study suggest that the chromium-cobalt alloy framework is a superior material for distal extension partial dentures compared to the other groups tested. Further studies are needed to investigate the long-term clinical performance and durability of the framework.


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